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Title : Development of a Computer-Code for Viscous-Inviscid Analysis of Transonic Flow past Airfoils and Wings including Shock-wave Boundary Layer Interactions - Closure Report for ARDB project AE-O-147		*Document No.* PD AE 8702 *Date of issue*: January 87
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Abstract : A three-dimensional transonic inviscid code has been modified for the viscous effects. Viscous effects are incorporated into the full-potential transonic wing analysis code by using spanwise strip theory. The strip method considers the boundary layer growth along the streamwise direction but neglects that of the spanwise growth. In order to account for the suddenly thickened boundary layer in the shock region, a viscous ramp model which is represented by an analytical expression in terms of the boundary layer parameters behind the shock and the shock strength has been used. The viscous ramp model is inserted as a module within the boundary layer computation and the displacement thickness is computed with this hybrid method. Viscous correction obtained by iteratively adding the displacement thickness stripwise to the wing surface for the three-dimensional full-potential solution.

Computational results obtained by the code are compared with wind tunnel data for a typical transonic wing. Comparison shows a reasonable agreement between theory and experiment. Computations were carried out on the UNIVAC 1100/60 computer at the National Aeronautical Laboratory.